L Number	Hits	Search Text	DB	Time stamp
-	10	ATM and (signal with pin) with (alarm alert)	USPAT	2003/10/16 14:03
-	43	ATM same (signal with pin)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2003/10/16 14:05
-	16	ATM same ((emergency alarm alert) with pin)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2003/10/16 14:16
-	5	ATM same ((emergency alarm alert) with pin) and (biometric finger$6 iris)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2003/10/16 14:17

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DISCLOSURE TEXT:

In a banking system using an Automatic Teller Machine (ATM) which is also known as a Personal Banking Terminal, means is provided for an authorized individual secretly to inform the system that he is under duress; that is, his session is not under his control but that of another individual. When thus alerted that a customer's session is not legitimate (from the individual's point of view), previously defined system actions can be taken.

- Electronic systems which require a user to identify himself and establish his authority to execute certain transactions are becoming common. There are, within many business establishments, systems which provide for electronic mail, payroll processing, accounts receivable processing and program development in addition to other applications far too numerous to mention. The use of personal computers in the home to access extensive communications networks is

increasing. Automatic Teller Machine (ATMs) are virtually everywhere and their capabilities are expanding. There are ATMs attached to banking networks that permit the withdrawal of cash and the transfer of funds from one account to another to name two common place applications.

This trend extends even to the telephone system where long distance telephone calls are made without operator intervention based on the possession of a 'phone card' that authorizes the call.

- In order to provide for transaction security and definite customer identification, many of these systems require the user or customer to provide a magnetically coded card and a personal identification number (PIN). If the correct PIN is provided to the system, the transaction is completed. If an incorrect PIN is entered, the transaction is aborted. In some systems, if the PIN is incorrectly entered a number of times, the customer's card is confiscated.
- None of these systems provide any way for a legitimate user who is under the physical control of an unauthorized individual to take any action to protect himself by calling for help without the knowledge of the unauthorized person. While instances of such situations do not seem to be wide-spread today, they may become more frequent as more systems are placed in use and more opportunities for such criminal behavior are created.
- This article describes a means for a legitimate user to secretly inform a system that his actions are not freely taken. Once alerted, the system can respond in any of a number of predetermined

ways ranging from 'record the alert only, take no action' to 'dispatch appropriate authorities to this location.' A system with this capability provides a deterrent to criminal behavior, a sense of safety to its legitimate users and a means of system self protection in the event of a coerced, unauthorized access.

There are seven constraints that a method to provide this silent alarm should meet. First, it should be possible for the authorized individual to alert the system without the knowledge of the unauthorized person. Second, since the authorized user may well be in a state of high emotion, the method should be simple to remember and use; this suggests it should be as similar to normal behavior as possible. Third, the alert mechanism must be under the control of the authorized user so that no alert is issued if the user feels that doing so would jeopardize him. (A person's willingness to resist a criminal action is often determined by the degree of perceived consequent loss to him. One who has only $5.00 in his wallet is perhaps more likely to submit to a mugger than one who has $500.00 on his person, although there is wide variation in individual behavior.) Fourth, it should not require extensive hardware, software or internal licensed programming to implement (to keep the development and maintenance costs low). Fifth, it should not place any unusual or difficult constraints on existing systems or their operations. For example, a system that did not require a re-issuance of ATM access cards would be preferred over one that required all users to receive a new access card. Sixth, the

implementation should not preclude, by its presence, any additional features that might be desirable. Seventh, it should be possible to define a range of actions to be taken in the event of an alert being raised.

- In light of the above, the present invention provides a means for a legitimate user to secretly inform a system that his actions are not freely taken. Once alerted, the system can respond in any of a number of predetermined ways ranging from 'record the alert only, take no action' to 'dispatch appropriate authorities to this location.' A system with this capability provides a deterrent to criminal behavior, a sense of safety to its legitimate users and means of system self protection in the event of a coerced, unauthorized access.

- The coercion detection scheme consists of altering the existing access code verification mechanism (e.g., verification of PINs or passwords) to allow recognition of the legitimate access code when the code has been entered in reverse order and, further, to recognize this as an 'alert'. The verification mechanism should then take the appropriate action, as previously defined for this system and user, to respond to the alert.

- For example, suppose the user's ATM PIN was '1435'. To indicate that he was acting under duress, the user would enter his PIN as '5341' rather than '1435.' This inverted or reversed PIN would normally be rejected but with the addition to the ATM PIN verification mechanism of coercion detection the '5341' would be recognized as a valid alert PIN and the ATM system

would take the
previously defined alert action.
- There are, of course, alternative algorithms that could be
used. For example, the ALERT PIN could be the user's PIN with the
addition (subtraction) of a constant. To the PIN used above, '1435'
add the constant '1111' to make the ALERT PIN '2546.' For another
alternative, simply add a constant of '5' so the ALERT PIN would
become '1440.' It's evident that the particular algorithm, provided
that it meets the seven constraints, is not important. It's
desirable, from a cost and simplicity perspective that the algorithm
be the same for all customers, but it's certainly possible to make a
set of different algorithms available. Such an approach, which is
slightly more costly and difficult to implement (and slightly
increases the likelihood of a random attack succeeding) has the
advantage of providing additional protection for the user of the
ALERT PIN.
That is, if only one algorithm is available for an ALERT
PIN, then it can be assumed that everyone knows that (and hence an
unauthorized person might be tempted to force a legitimate user to
provide the PIN, undo the (supposed) algorithm and then attempt to
use it. Were there two or more alternative ALERT PIN algorithms, it
would be more difficult to succeed with this (and there would be
higher degree of deterrence).
- For the sake of simplicity, consider that there is only one
algorithm for creating the ALERT PIN from a valid one. The algorithm
is entry of the PIN in reverse order. Note that this algorithm

provides the seven advantages described above.

1. A PIN of '5341' is no more or less likely than a PIN of '1435' hence an unauthorized person has no way to know if the alert has been given or not.
2. Entering the PIN (or password) in reverse order is easy to remember and do.
3. By permitting the user the choice of either '1435' or '5341' the decision to raise the alarm resides with the user.
4. Reversing the characters and attempting a reverification does not require any additional hardware (although it could be implemented fully or partially as such) and can be implemented using a small amount of either software or microcode. A coercion response action table would also require some internal storage and code or hardware (see 7, below).
5. This scheme does place a small constraint on existing systems; all PINs or passwords that were 'palindromic' (that is, they read the same backwards as forward) would have to be re-issued as non-palindromes, and any PIN or password checking programs would have to be changed to reject a user-selected palindromic PIN or password. For example, a PIN of '1331' could not be used. The rejection of palindromic PINs and passwords also increases slightly the likelihood of a random guess being correct; this is exactly offset, however, by the likelihood that the random guess raises the alarm]
6. Additional features will not be precluded by this scheme.
7. Once the alert has been set within the program or hardware, by reference to an internally stored table or data

magnetically
stored on an ATM access card, for example, the action defined for
this user could be taken. (Note that a null table entry for a
user could easily be defined to mean that this user has declined
the use of the coercion detection mechanism; in such a case, the
system would behave exactly as though the valid PIN had been
entered.)
An additional advantage of the coercion detection mechanism is
this: an unauthorized user can take the access card (or password) or
be given it by the legitimate user along with the ALERT PIN (the
reverse, that is, of the correct PIN or password). Then, every time
the card is used, the unauthorized user transmits his location to the
system. This can only make apprehension easier.
Since it can be
expected that potential unauthorized users will know about the ALERT
PIN, it might be expected that they would reverse the PIN that a
legitimate user provided. This presents an interesting scenario: if
the unauthorized user suspects that he has been given the ALERT PIN
and reverses it (in the hope of then passing himself off as the
legitimate user) when in fact, he was given the valid PIN, he will
then be contributing to his own apprehension. On the other hand, if
he assumes that he has the valid (the non-reversed PIN) when he
actually has the ALERT PIN, he is once again contributing to his
apprehension. The point is that the unauthorized user has no way of
knowing since the system may present identical operation for both the
PIN and the ALERT PIN.
- This ALERT PIN provides a simple solution to a

potentially very
serious situation, that of legitimate users who are forced to
participate in the subversion of a system that they're authorized to
access. While the description given in this article has focused on
PINs and ATMs, the approach is far more general and can be adapted to
a wide variety of situations easily and effectively. The legitimate
users are provided with a safe way to alert the system to their
situation and may be provided with an option to define the action
they wish taken in the event of coercion. Example actions are:

- Limit the allowed dollar amount of transactions
- Limit authority to selected transaction types
- Display "dummy" account information
- "Close" an ATM
- Notify authorities (silent alarm)
- Dispatch security personnel or police

US005354974A

United States Patent [19]

Eisenberg

[11] Patent Number: 5,354,974

[45] Date of Patent: Oct. 11, 1994

[54] **AUTOMATIC TELLER SYSTEM AND METHOD OF OPERATING SAME**

[75] Inventor: Alan J. Eisenberg, Monmouth Junction, N.J.

[73] Assignee: Base 10 Systems, Inc., Trenton, N.J.

[21] Appl. No.: 981,038

[22] Filed: Nov. 24, 1992

[51] Int. Cl.[5] G06K 5/00

[52] U.S. Cl. 235/379; 235/380

[58] Field of Search 235/379, 380

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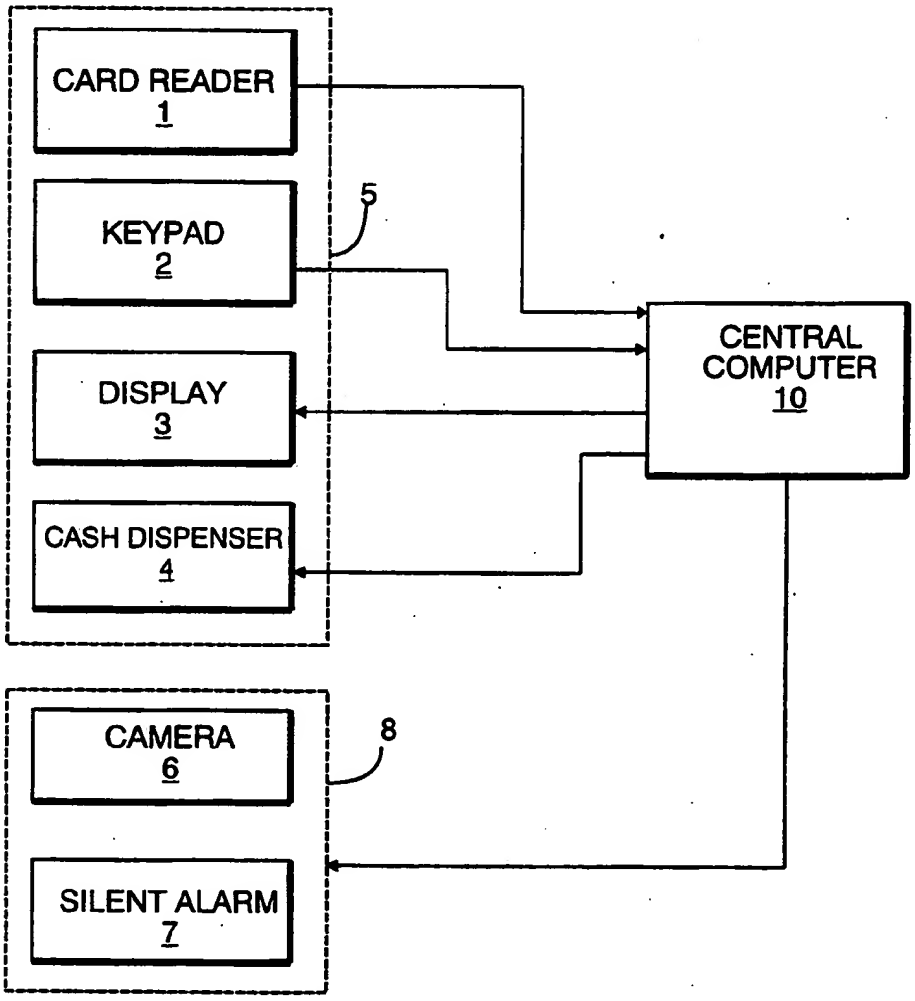
Primary Examiner—Harold Pitts

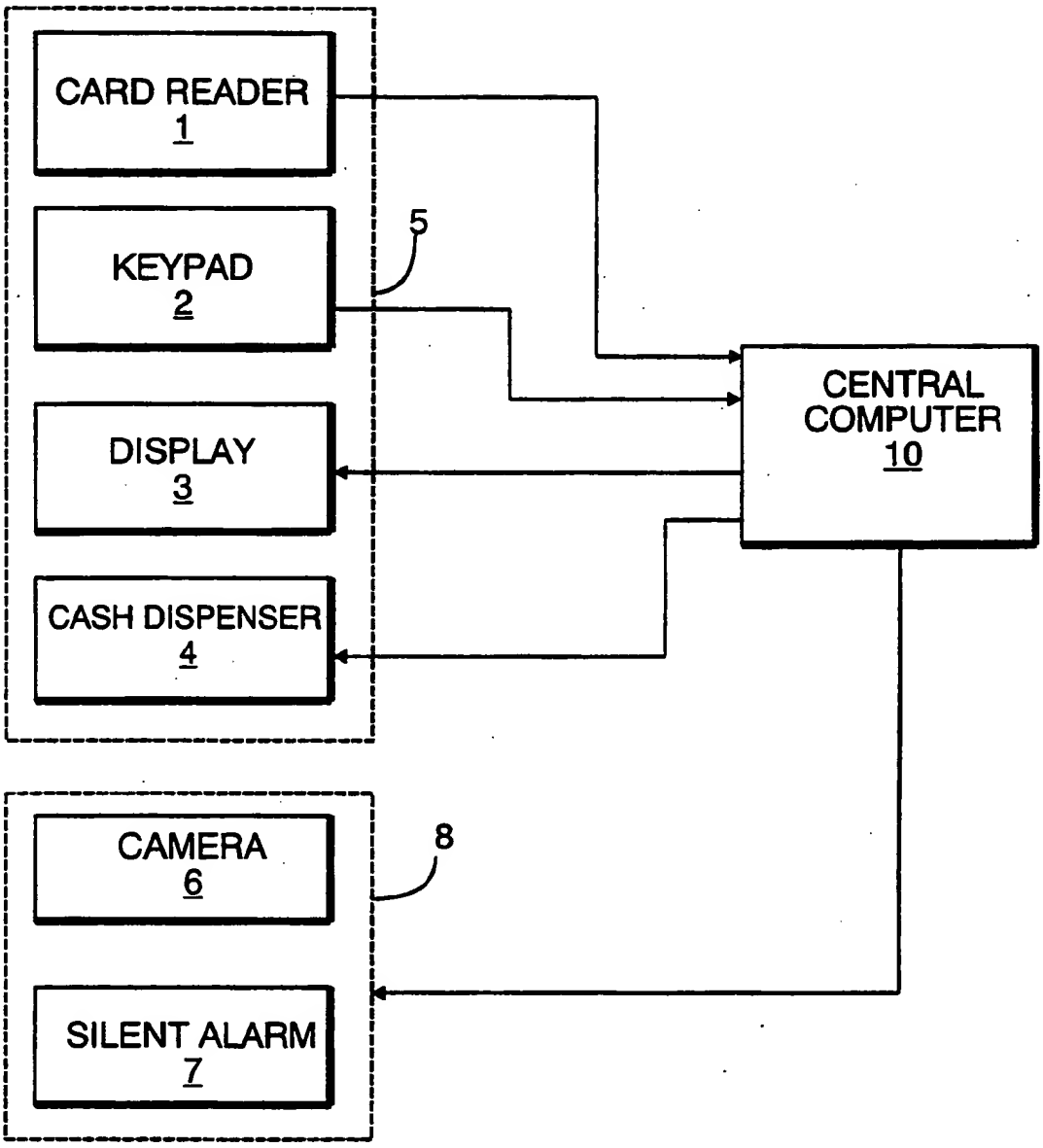
Attorney, Agent, or Firm—Sprung Horn Kramer & Woods

[57] ABSTRACT

An automatic teller system and a method of operating same wherein the system can receive a personalized normal PIN number and emergency PIN number from a user. If the user enters the emergency PIN number, the system determines that it is an emergency PIN number and actuates a silent alarm. The system will also simulate a normal transaction so as to not alert a thief or potential thief that the alarm has been actuated.

5 Claims, 2 Drawing Sheets




CARD READER
1
KEYPAD
2
5
DISPLAY
3
CASH DISPENSER
4
CENTRAL
COMPUTER
10
CAMERA
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8
SILENT ALARM
7

FIG. 1

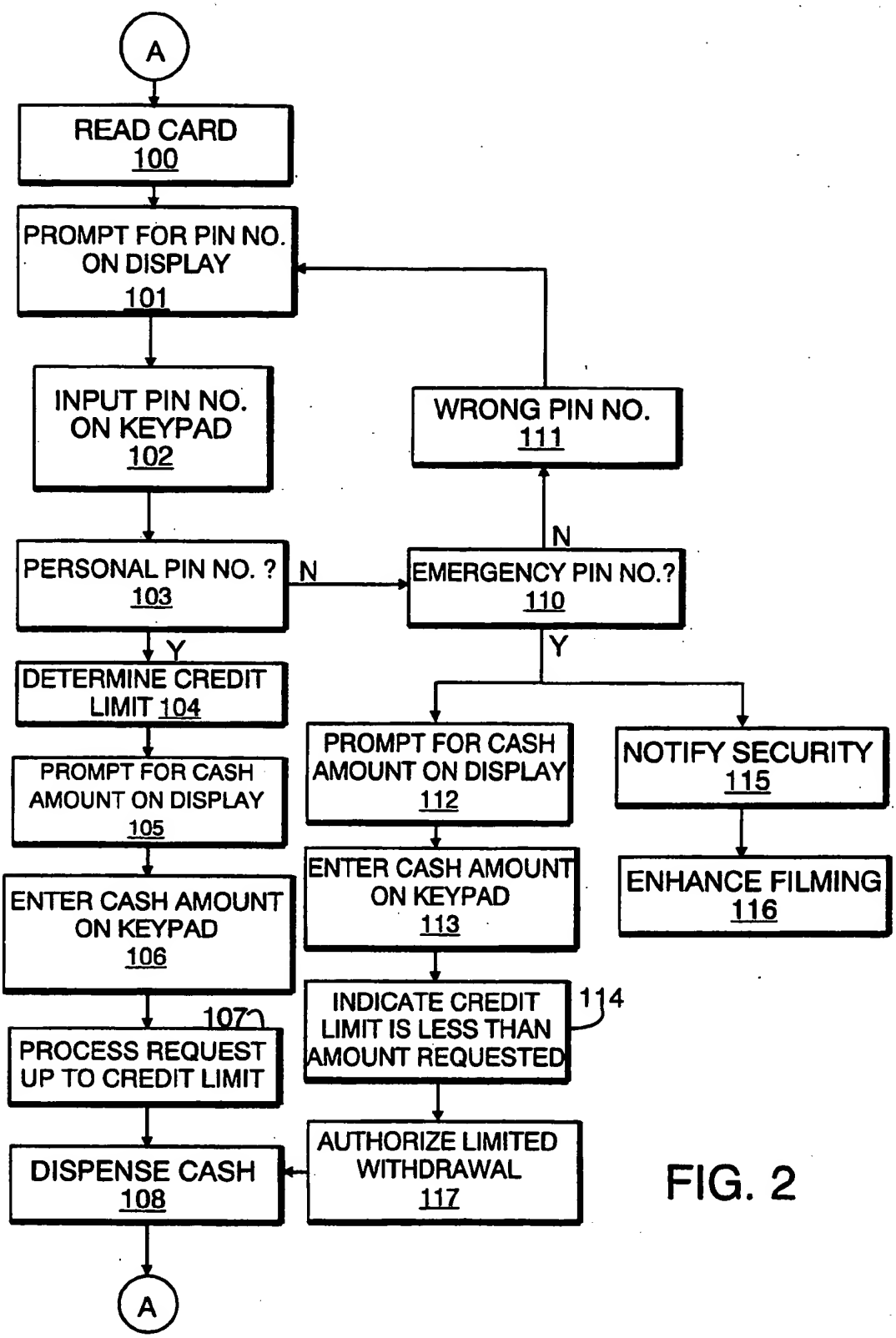
A
READ CARD 100
PROMPT FOR PIN NO. ON DISPLAY 101
INPUT PIN NO. ON KEYPAD 102
PERSONAL PIN NO. ? 103
N
EMERGENCY PIN NO.? 110
WRONG PIN NO. 111
N
Y
Y
DETERMINE CREDIT LIMIT 104
PROMPT FOR CASH AMOUNT ON DISPLAY 105
ENTER CASH AMOUNT ON KEYPAD 106
107
PROCESS REQUEST UP TO CREDIT LIMIT
DISPENSE CASH 108
A
PROMPT FOR CASH AMOUNT ON DISPLAY 112
ENTER CASH AMOUNT ON KEYPAD 113
INDICATE CREDIT LIMIT IS LESS THAN AMOUNT REQUESTED
114
AUTHORIZE LIMITED WITHDRAWAL 117
NOTIFY SECURITY 115
ENHANCE FILMING 116

FIG. 2

AUTOMATIC TELLER SYSTEM AND METHOD OF OPERATING SAME

BACKGROUND OF THE INVENTION

The present invention relates to an automatic teller system and a method of operating same.

Current automatic teller systems allow a user to withdraw cash from an automatic teller machine (ATM) by first inputting a credit card into a card reader and thereafter entering a personal identification number (PIN number) on a keypad. The system determines that the user is authorized to make a withdrawal on the basis of the correctness of the PIN number, and thereafter determines the credit limit for that particular credit card. The system thereafter prompts the user on a display for the amount of cash to be withdrawn, and the user enters the cash amount on the keypad. The request is processed up to the credit limit, and cash is dispensed to the user.

In recent years, it has become common for thieves to pray on automatic teller machine users, by either accosting the user after completing a transaction or by inducing the user under the threat of force to make a withdrawal from the user's account.

The current systems such as those shown in U.S. Pat. Nos. 4,359,630; 5,029,290; 5,103,079; 5,095,196; 4,801,787; 4,798,941; 4,650,980; and 4,304,990 have no way in which to enable the user to signal that either there is a fear of being accosted upon finishing the transaction or that the transaction is being entered into under duress.

In U.S. Pat. No. 4,375,032 a transaction processing system is disclosed wherein when card is reported lost or stolen by a user, its subsequent unauthorized use triggers a mode wherein the transaction is delayed to detain the unlawful user. No use is made of a PIN number.

In U.S. Pat. No. 4,675,815 a system is described wherein a bank employee at a remote location who is crediting funds to an account can enter a predetermined code in place of another entry to indicate an unlawful transfer. This system does not utilize a PIN number for each transaction and uses a single code for all users to signal a problem.

SUMMARY OF THE INVENTION

The main object of the present invention is to eliminate the disadvantages of the present systems and to provide an automatic teller system and a method of operating same to enable a user to actuate an alarm without alerting a thief or potential thief.

These and other objects and advantages of the present invention are achieved in accordance with the present invention by a method of operating an automatic teller system wherein the user is assigned a unique or personalized emergency PIN number in addition to the normal unique PIN number. The system then checks the entered PIN number to determine whether it is an emergency PIN number for that user or not and, if an emergency PIN number has been entered, actuating an alarm, preferably a silent alarm. Moreover, the method includes enabling cameras set up at the automatic teller system to record the transaction either in an enhanced manner or with more cameras so that the identity of the thief can be more reliably obtained for later apprehension and conviction. The silent alarm will enable bank security people or the police to be dispatched immediately to the ATM. Video and audio information can be transmitted via modem to bank security people or the police at the same time.

Each user is assigned a personalized emergency PIN number similar to the standard PIN number, instead of a common one for all users. It is impossible for a thief to know that an emergency PIN number has been entered since the numbers would not be easily identified, i.e., one user may have an emergency PIN number which is the same as another user's standard PIN number.

In a preferred embodiment of the present invention, the method also includes simulating a normal transaction in response to the determination that an emergency PIN number has been entered. The simulated transaction is carried out so as to avoid alerting the thief or potential thief that authorities have been notified. In the simulated normal transaction, the user is prompted for the amount of cash to be withdrawn on the display as in a normal transaction, and the user is thereafter asked to enter a cash amount on the keypad similar to a normal transaction. However, this system will automatically indicate that the credit limit is less than the amount requested so that only a limited amount of cash will be dispensed. This will reduce the amount of the theft while appearing to be a normal transaction and not alerting the thief to the fact that an alarm has been actuated.

Moreover, the cash dispenser can dispense marked bills from a special supply of bills, so that the bills that are dispensed can be identified later.

These and other features and advantages of the present invention are also achieved in accordance with an automatic teller system according to the present invention comprising means receptive of a personal PIN number and a unique or personalized emergency PIN number input by a user, means for determining that an entered PIN number is an emergency PIN number and means responsive to that determination for actuating an alarm, preferably a silent alarm. The automatic teller system according to the present invention also preferably includes means for simulating a normal transaction in response to the determination that an emergency PIN number has been entered including means for dispensing a predetermined limited amount of cash to the user.

These and other features of the present invention will be described in the following detailed description of the invention taken with the attached drawings, wherein:

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram of the automatic teller system in accordance with the present invention; and

FIG. 2 is a flow chart of the method according to the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Referring now to FIG. 1, the automatic teller system according to the present invention includes an automatic teller machine (ATM) 5 which includes a magnetic stripe card reader 1, a user keypad 2, a display 3 and a cash dispenser 4. The system also includes a central computer 10 which receives the information read from the credit card reader 1 and personal identification numbers entered on keypad 2 and prompts the user via display 3 and actuates cash dispenser 4 to dispense cash to the user.

The keypad 2 is used by a user to enter a personal identification number in the form of either a normal PIN number or an emergency PIN number which has been assigned to the user by the bank. The central computer 10 receives the PIN number from the keypad 2 and is able to determine, based upon lists of PIN numbers for each account indicated by the card reader 1, whether the PIN number is a normal PIN number or an emergency PIN number. The central computer 10, upon determining that the PIN number is an emergency PIN number, controls a silent alarm 7 which immediately notifies the authorities that a theft is taking place at the ATM 5. The central computer 10 also actuates camera 6 either by enabling additional views of the scene or by enhancing the view of the scene such as by taking a close up of the scene.

The method of operating the automatic teller system is set forth in FIG. 2. As shown therein, at the starting point A the user inputs a magnetic stripe credit card into a card reader, and the card reader reads the card in step 100. The information is sent to the central computer 10 which then prompts the user on display 3 for entry of the PIN number in step 101. The user inputs the PIN number in step 102 via keypad 2. This information is sent to the central computer 10 which, in step 103, determines whether it is a personal PIN number or not. If the PIN number is the normal personal PIN number, the computer then determines the credit limit in step 104 and prompts the user on display 3 in step 105 for the amount of cash desired for withdrawal. The user then enters the amount of cash desired in step 106 on keypad 2 and the central computer 10 receives this information and processes this request in step 107 up to the credit limit. Thereafter, the central computer 10 in step 108 actuates the cash dispenser to dispense cash. The system then returns to the ready state of step A.

If on the other hand, the central computer 10 determines in step 103 that the PIN number is not the normal personal PIN number, the central computer then makes a determination in step 110 if it is an emergency PIN number. If it is not an emergency PIN number, the determination is made in step 111 that it is just the wrong PIN number and the user is again prompted in step 101 to enter a PIN number on the keypad 2.

If the central computer 10 determines in step 110 that it is an emergency PIN number assigned to that user, the central computer then acts to perform two functions. The first function in steps 115 and 116 is to actuate a silent alarm and notify security in step 115 of a theft or a potential theft taking place. In step 116, the central computer actuates a camera 6 to either start filming the scene or to enhance the filming by obtaining a close up of the scene.

The other function carried out by the central computer 10 is to simulate a normal transaction so as to avoid alerting the thief or potential thief that an alarm has been actuated. In this matter, the central computer 10 controls the display 3 to prompt the user for a cash amount in step 112. The user then enters the desired amount of cash on keypad 2 in step 113. Rather then treating this transaction wherein the user is permitted to withdraw an amount up to the user's actual credit limit, the central computer controls display 3 to indicate that the credit limit is less than the amount requested in step 114 so as to artificially limit the amount of the transaction to reduce the amount of theft. The central computer then authorizes this limited withdrawal in step 117 and actuates cash dispenser 4 in step 108 to dispense this limited amount of cash. The system then returns to the ready state in step A.

It is understood that the present invention is not limited to the particular embodiments illustrated and described hereinabove, but that various changes and modifications may be made without departing from the spirit and scope of the invention as defined in the claims.

What is claimed is:

1. In a method of operating an automatic teller system wherein a card is input by a user, the card is read, a personalized normal first PIN number selected by the user is entered by the user and is checked to determine whether the use of the card is authorized, if authorized a credit limit is determined and a desired amount of cash not exceeding the credit limit is dispensed to the user, the improvement comprising the steps of: providing a personalized emergency second PIN number to each user selected by the user in addition to the personalized normal first PIN number; checking the entered PIN number of each user to determine whether it is the normal first or emergency second PIN number of that user; and actuating an alarm in response to the determination of an entered emergency second PIN number for that user, while dispensing a limited amount of cash to that user.

2. The method according to claim 1, further comprising simulating a normal transaction upon the determination of an entered emergency second PIN number by prompting the user to enter a desired amount of cash, displaying a message that the desired amount exceeds the user's credit limit and dispensing a preselected limited amount of cash.

3. The method according to claim 1, wherein the step of actuating an alarm comprises actuating a silent alarm.

4. The method according to claim 1, further comprising enabling cameras at the automatic teller system in response to a determination of an entered emergency second PIN number.

5. The method according to claim 1, wherein the step of dispensing a limited amount of cash comprises dispensing marked bills.

* * * * *